XVII. PATHOGENS OF ANOPLURA AND MALLOPHAGA (LICE) [a]

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PATHOGENS OF ANOPLURA AND MALLOPHAGA (LICE)

Host	Host stage infected	Pathogen	% incidence	Locality	Lab. or field study	Reference
ANOPLURA		RICKETTSIAE				
Pediculus humanus	-	Rickettsia akari	-	-	-	Jenkins (1973)
"	-	R. conorii	-	-	-	" "
"	-	R. prowazeki	-	-	-	Jenkins (1973), Rehaček (1965)
"	-	R. typhi	(Maybe)	-	-	Jenkins (1973)
"	-	R. rickettsi	-	-	-	" "
"	-	R. tsutsugamushi	-	-	-	" "
"	-	Wolbachia persica	-	-	-	Jenkins (1973), Weyer (1973)
Polyplax spinulosa	-	Rickettsia prowazeki	Kills lice	Mexico	Lab.	Mooser et al. (1931)
		BACTERIA				
Pediculus humanus	Adults	Bacillus pediculi	High	England	Lab.	Arkwright & Bacot (1921)
"	-	Staphylococcus aurens	-	-	-	Jenkins (1973)
"	-	Eberthella typhosa (not a recognized taxon)	-	-	-	" "
"	-	Escherichia coli	Kills in 2 days	-	-	" "
"	-	Yersinia pseudo-tuberculosis	60-90 mortality	-	-	" "
"	-	Proteus vulgaris	Kills in 2 days	-	-	" "

PATHOGENS OF ANOPLURA AND MALLOPHAGA (LICE) (continued)

Host	Host stage infected	Pathogen	% incidence	Locality	Lab. or field study	Reference
P. humanus (continued)	-	Francisella tularensis	Variable mortality kills in 4-7 days	USA	-	Price (1957)
"	-	Strickeria jurgensi	Sometimes very abundant	Germany	-	Stempell (1916)
"	-	Salmonella enteritidis	100 mortality in 2 days	-	-	Jenkins (1973)
"	-	Shigella dysenteriae	-	-	-	" "
"	-	Yersinia enterocolitica	60-90 mortality	-	-	" "
Linognathus sp.	-	Yersinia pestis	Kills lice	Transbaikalia and Mongolia	Lab.	Jettmar (1925)
		PROTOZOA				
Pediculus humanus	Adults	Cocconema pediculusvestimenti	-	USSR	Field	Popov & Manuilova (1926)
"	Nymphs, adults	Leptomonas pediculi	8	England	Field	Fantham (1912)
"	Adults	Toxoplasma gondii	71	Poland	Lab.	Dutkiewicz (1966)

PATHOGENS OF ANOPLURA AND MALLOPHAGA (LICE) (continued)

Host	Host stage infected	Pathogen	% incidence	Locality	Lab. or field study	Reference
MALLOPHAGA	BACTERIA					
Bovicola bovis	-	Bacillus thuringiensis (various preparations)	50 mortality in 23-172 hrs depending on preparation	USA (Texas)	Lab.	Gingrich et al. (1974)
Bovicola crassipes	-	"	"	"	"	"
Bovicola limbatus	-	"	"	"	"	"
Bovicola ovis	-	"	"	"	"	"
Lipeurus caponis	-	Bacillus thuringiensis	up to 100 mortality	USA (Texas)	Lab.	Hoffman & Gingrich (1968)
Menacanthus stramineus	-	"	"	"	"	"
Menopon gallinae	-	" "	"	"	"	"
		FUNGI				
Bruelia cyclothorax	Adults	Trenomyces helveticus	-	USSR	Field	Lunkashu (1970)
Bruelia gracilis	Adults	" "	-	"	"	" "
Bruelia nebulosa	Adults	" "	-	"	"	" "
Bruelia uniinosa	Adults	" "	-	"	"	" "
Gonides gigas	Adults	Trenomyces histophtorus	rare	France	Field	Chatton & Picard (1909)

PATHOGENS OF ANOPLURA AND MALLOPHAGA (LICE) (continued)

Host	Host stage infected	Pathogen	% incidence	Locality	Lab. or field study	Reference
Menopon gallinae	Adults	Trenomyces histophtorus	10	France	Field	Chatton & Picard (1909)
Menopon gallinae	-	" "	-	Italy	Field	Trinchieri (1910)
Menopon gallinae	-	" "	-	Argentina	Field	Spegazzini (1917)
Picicola coutiguus	Adults	Trenomyces helveticus	-	USSR	Field	Lunkashu (1970)
Saemundssonia sp.	-	Trenomyces platensis	-	Argentina	Field	Spegazzini (1917)
Sturnidoecus ruficeps	Adults	Trenomyces helveticus	-	USSR	Field	Lunkashu (1970)
Many species of Mallophaga	-	Trenomyces (5 species)	-	Europe and North America	Field	Thaxter (1912)
		NEMATODA				
Dennyus hirundis	-	Filaria cypseli	-	Gambia	Field	Dutton (1905)
Heterodoxus spiniger	Adult	Dipetalonema reconditum	17	Kenya	Field	Nelson (1962)

ABSTRACTS

Mary Ann Strand

Arkwright, J. A. & Bacot, A. (1921). A bacillary infection of the copulatory apparatus of Pediculus humanus. Parasitology, 13: 25-26.

A gram-negative cocco-bacillus was isolated from the excreta, guts, and copulatory apparati of the lice. No pathogenic conditions were reported in the infected lice.

Chatton, E. & Picard, F. (1909). Contribution à l'étude systématique et biologique des Laboulbeniacees: Trenomyces histophtorus Chatton et Picard, endoparasite des poux de la poule domestique. Bull. Trimest. Soc. Mycol. Fr., 25: 147-170.

The fungus, T. histophtorus, grows in the fat body of the lice Menopon gallinae (=M. pallidum) and Goniodes gigas (=Gonicotes abdominalis). A detailed description of the growth habit of the fungus is given. The taxonomic status of the genus Trenomyces in the Laboulbeniales is discussed.

Dutkiewicz, J. (1966). Studies on the biological properties of Toxoplasma gondii in the body of insects, using Pediculus humanus L. as test animals. Acta Parasitol. Pol., 14: 187-199.

T. gondii was introduced into the alimentary system of the lice by intrarectal injection. It was able to penetrate the cells of the intestinal epithelium and hemocytes and to multiply. Infected lice died 120-144 hours after injection. The mortality may be due to the damage to the tissues as a result of T. gondii multiplication.

Dutton, J. E. (1905). The intermediate host of Filaria cypseli (Annett, Dutton, Elliot); the filaria of the African swift, Apus affinis. Thompson Yates (and Johnston). Lab. Rep., 6: 137-147.

Reference not seen by M. A. Strand.

Fantham, H. B. (1912). Herpetomonas pediculi nov. spec., parasitic in the alimentary tract of Pediculus vestimenti, the human body louse. Proc. R. Soc. Ser. B, 84: 505-517.

H. pediculi was found in the alimentary tract and feces of lice collected from children in England. It is transmitted through excretion and ingestion of the trypanosomes. Fantham does not mention the effect of infection on the lice.

Gingrich, R. E. et al. (1974). Bacillus thuringiensis: Laboratory tests against four species of biting lice (Mallophaga: Trichodectidae). J. Invertebr. Pathol., 23: 232-236.

The species of Bovicola were more susceptible to spore- -endotoxin complex than to beta-endoxin.

Hoffman, R. A. & Gingrich, R. E. (1968). Dust containing Bacillus thuringiensis for control of chicken body, shaft, and wing lice. J. Econ. Entomol., 61: 85-88.

One or more applications of a commercial preparation of B. thuringiensis gave complete control of the 3 species of lice on chickens for varying periods of time.

Jenkins, D. W. (1973). Biologic control of human lice. Pan. Am. Health Organ. Sci. Publ., 263: 256-260.

Body lice and head lice are normally free from pathogenic microorganisms. Various viruses pathogenic to humans have been introduced into lice, however, no pathogenicity for the lice has been reported. There are no known rickettsiae pathogenic for mice that do not produce disease in humans, except possibly E strain of Rickettsia prowazeki. Twenty species of bacteria have been tested for pathogenicity for lice, but all that were pathogens of lice were also pathogenic for man. Staphylococcus aureus passed many times in lice did increase in virulence for lice in some cultures. No spirochetes have been confirmed to be pathogenic for lice.

Jettmar, H. M. (1925). Beitrage zum Studium der Pest unter den Insekten. I. Mitteilung. Die Tarbaganlaus. Z. Hyg. Infektionskr., 104: 551-568.

Plague bacilli (Yersinia pestis) multiply in the louse Linognathus sp. which dies 2-3 days after feeding. Virulent bacilli are found in the gut and feces of infected lice.

Lunkashu, M. I. (1970). /Fungi of the genus Trenomyces from bird lice of birds from Moldavia/. Parazity Zhivotn. Rast., 5: 128-130 (Russian).

T. helveticus was present on the thorax, abdomen, legs and head of several species of avian Mallophaga.

Mooser, H. et al. (1931). The transmission of the virus of Mexican typhus from rat to rat by Polypax spinulosus. J. Exp. Med., 54: 567-575.

Rickettsia prowazeki was observed in lice after they had fed on an infected rat. The rickettsiae multiply in the epithelial cells of the gut, destroying its lining, and leading to the death of the louse.

Nelson, G. S. (1962). Dipetalonema reconditum (Grassi, 1889) from the dog with a note on its development in the flea, Ctenocephalides felis and the louse, Heterodoxus spiniger. J. Helminthol., 36: 297-308.

The larvae of D. reconditum developed in the fat body of H. spiniger taken from infected dogs in Kenya. Also filaria were seen in Dennyus hirundis. No pathological conditions were mentioned.

Popov, P. & Manuilova, M. (1926). /On the discovery in the human body louse - Pediculus vestimenti, Nitzsch a microsporidian parasite sp. nov./ Russ. Z. Trop. Med., 4(8): 43-49 (Russian, English summary).

Cocconema pediculusvestimenti was observed in the cells of the intestine and fat body of the louse.

Price, R. D. (1957). A microscopic study of Pasteurella tularensis in the human body louse. Parasitology, 47: 435-446.

Multiplication of the bacteria is extracellular in the midgut lumen and the haemolymph and is intracytoplasmic in the gut cells of the louse Pediculus humanus. The gut cells are disrupted and the bacteria enter the body cavity. Their growth in the hemocoel is fatal, death usually occurs in 4-7 days.

Rahăček, J. (1965). Development of animal viruses and rickettsiae in ticks and mites. Ann. Rev. Entomol., 10: 1-24.

Among rickettsiae, only Rickettsia prowazeki is reported to kill its vector-lice.

Spegazzini, C. (1917). Revision de las Laboulbeniales Argentinas. An. Mus. Nac. B. Aires, 29: 445-688.

Spegazzini mentions two species of Trenomyces observed on all parts of the bodies of two mallophagan species in Argentina.

Stempell, W. (1916). Ueber einen als Erreger des Fleckfiebers verdächtigen Parasiten der Kleiderlaus. Dtsch. Med. Wochenschr., 42: 439-442.

A new genus and new species of flagellate, Strickeria jurgensi, is named. It was found in the intestine of Pediculus humanus.

Thaxter, R. (1912). Preliminary descriptions of new species of Rickia and Trenomyces. Proc. Am. Acad. Arts Sci., 48: 365-386.

T. histophtorus, T. lipeuri, T. laemobothrii, T. circinans, and T. gibbus are described; the latter two as new species. Thaxter examined thousands of lice and considered their infestation with Trenomyces as rare.

Trinchieri, S. G. (1910). Intorno a una Laboulbeniacea nouva per l'Italia (Trenomyces histophtorus Chatton et Picard). Boll. Soc. Nat. Napoli, 24: 18-22.

T. histophtorus was found on Menopon gallinae (=M. pallidum) in Italy.

Weidhaas, D. E. (1973) Biologic control of lice. Pan. Am. Health Organ. Sci. Publ., 263: 256.

The use of biological agents to control human lice has received little attention by researchers. Effective agents which are safe for humans have not been identified and other methods of control such as sanitation and chemical control are available.

Weyer, F. (1973). Versuche zur Übertragung von Wolbachia persica auf Kleiderläuse. Z. Angew. Zool., 60: 77-93.

W. persica was successfully transferred to the gut and hemolymph of body lice. In all cases, the organisms multiplied and had a damaging effect on the hosts which died within a few days. In the lumen of the louse gut, multiplication was predominantly extracellular, although evidence of intracellular multiplication was seen in epithelial cells. W. persica was found in the feces and in oviposited eggs but infection in the progeny was not observed.